



Serial No.: 10/675,062
Inventor(s): DeAngelis et al.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: DeAngelis, et al.
Serial Number: 10/675,062
Filed: September 30, 2003
For: **Flexible Heater**
Group Art Unit: 3742
Examiner: Patel, Vinod D.

Commissioner for Patents
PO Box 1450
Alexandria VA 22313-1450

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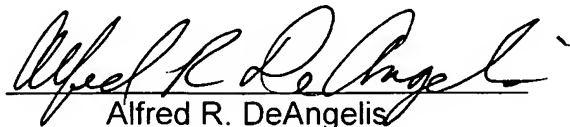
Date: February 17, 2005

Signature: Heidi M. Lewis

Name: HEIDI M. LEWIS

DECLARATION OF PRIOR INVENTION UNDER 37 CFR §1.131

1. My name is Alfred R. DeAngelis and I reside at 248 Creek Ridge Drive, Spartanburg, SC 29301.
2. I have been employed by Milliken & Company since March 15, 1993, and my current title is Senior Research Physicist.
3. I am an inventor on the U.S. Patent Application Number 10/675,062, which was filed on September 30, 2003.
4. Attached hereto is a printout of a letter which describes in detail certain aspects of this invention. The letter was written on May 18, 2000, and was sent in confidence on May 19, 2000, to Mark Sullivan of Sunbeam, Inc. The text of the attached printout is identical to the letter sent to Mr. Sullivan, except for various portions of the letter not necessary to establish prior invention have been redacted.
5. From this letter it can be seen that, to the extent that it is disclosed in U.S. 6,768,086, the invention in the present application had already been conceived and described with sufficient clarity to reduce the invention to practice prior to the July 8, 2002, filing date of US6,768,086.
6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.


Alfred R. DeAngelis



May 18, 2000

Mark Sullivan
Sunbeam, Incorporated
224 Russell Drive
Waynesboro, Mississippi 39367

Dear Mark:

With all the phone conversations we've had recently, I thought it would be useful if I summarized where we are and what we have in mind. This will be similar to what we discussed early today. I'm hoping it will be helpful for you to have it on paper. Also, I thought it might be helpful introductions to Armando and Charles, especially with respect to our meeting next week.

Our vision for a fabric-based heated blanket, as we've shown, is to combine conductive heating yarns with transversely placed electric leads (busbars). The preferred conductive materials and fabric construction is dictated by the requirements you place on the final product. Below is a list of the various requirements, along with the approach Milliken has come up with to meet those requirements.

1. The fabric dimensions, voltage, and heat-generating specifications determine the electrical requirements. In particular, it defines the necessary yarn conductivity and frequency of placement. We are currently working on a 30" x 70" blanket that needs to generate about 0.08 W/in² at 120 volts or less. Depending on the final voltage chosen, we have a variety of yarns we can use to generate heat at a spacing of roughly 1/2" to 3". The most promising at this stage are silver-coated filament yarns, spun yarns containing stainless steel, and a yarn wrapped with 1-4 stainless steel filaments.
2. Feedback and control of the heating had lead me to another suggestion. As you now control heat using a positive temperature coefficient material (PTC) in your wires, we could create a yarn of the same material. Unlike your wire, which is made of two conductors embedded in the PTC, the yarn would be a non-conductive core coated with PTC and laid or woven between the busbars. Like your wire, the PTC would generate less and less heat as it got hotter. The yarn could be extrusion coated, in somewhat the same manner as your wire. Though our attempt to first do this at Engineered Yarns has pointed out some of the production challenges, I am hopeful that we can make a suitable yarn. If we use a PTC yarn for heating, we will probably want to lay in a multitude of the transverse busbars. This will have the dual advantage of reducing the necessary conductivity of the PTC yarn, as well as increase the density of "control zones" in the fabric. That is, the temperature will be controlled on a finer spatial scale.
3. Even if PTC yarns can't be used to generate heat, they may be used to as sensors for temperature control. This would involve inserting PTC yarns transverse to the heating yarns (which would probably be one of the yarn types in point 1 above). The PTC

resistance could be monitored by a controller, which could reduce current supplied to that portion of the fabric. One method of doing this would be to mate each PTC sensing yarn with a lead yarn (busbar yarn), which the controller would individually address. This would give lateral strips of temperature control. An alternative to the PTC yarn would laminate the PTC over the lead yarn. Another alternative would be to coat either the lead or heating yarn, or both, with PTC material, which would act as a temperature-sensitive switch at the point of lead-heating yarn contact. It would also add a temperature-sensitive component to the heating yarn, which would partially control temperature by becoming less conductive at higher temperatures.

4.

[REDACTED]

5.

[REDACTED]

Of course, all this should be considered confidential information under our current agreement. Milliken has put, and is putting, a lot of effort into developing this fabric, including the development of the PTC yarn idea, proper fabric construction, and means of coating. We are committed to meeting all the challenges you have given us for creating the best possible heating fabric for Sunbeam.

I look forward to your visit next week.

Sincerely,

Fred DeAngelis

cc: Earle Wolynes

bc: Jeff Bacon

Joe Salley

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